

I Claim:

1. A method for producing improved polyolefin-based adhesive resin, comprising:
 - a. polymerizing a monomer composition of at least one olefin;
 - b. mixing with shear mixing the polymerization product following polymerization without first pelletizing the polyolefin with at least one graft polymer or copolymer in a heated mixing device at a temperature above the melting point of the components; and
 - c. recovering the resulting polyolefin-based adhesive resin.
2. The method of claim 1, wherein the polyolefin-based adhesive resin comprises from about 0.05 percent to about 30 percent by weight of graft copolymer.
3. The method of claim 1, further comprising the step of adding an adhesion promoting resin to the heated mixing device.
4. The method of claim 3, wherein the adhesion promoting resin comprises a thermoplastic elastomer.
5. The method of claim 3, wherein the adhesion promoting resin comprises a metallocene catalyzed ethylene copolymer.

6. The method of claim 1, wherein the at least one olefin is an alkene.
7. The method of claim 6, wherein the at least one olefin is ethylene.
8. The method of claim 1, wherein the monomer composition comprises a mixture of ethylene and at least one additional monomer.
9. The method of claim 8, wherein the monomer composition comprises a mixture of more than 50% by weight ethylene and less than 50% by weight of at least one additional monomer.
10. The method of claim 9, wherein the at least one additional monomer is selected from the group consisting of olefins having at least from 2 to 8 carbon atoms, unsaturated aliphatic hydrocarbons and ethylenically unsaturated esters or acids.
11. The method of claim 9, wherein the at least one additional monomer is an alkene monomer selected from the group consisting of propylene, butene-1, hexene-1, 4-methyl pentene-1, and octene-1.
12. The method of claim 9, wherein the at least one additional monomer is an ethylenically unsaturated ester or acid selected from the group consisting of vinyl acetate, methyl acrylate, ethyl acrylate, methyl methacrylate, ethyl methacrylate, butyl acrylate, acrylic acid, and methacrylic acid.
13. The method of claim 1, wherein the at least one olefin is propylene.
14. A method for producing improved polyolefin-based adhesive resin, comprising:

a. polymerizing a monomer composition selected from the group consisting of an olefin having from 2 to 8 carbon atoms, a mixture of an olefin having from 2 to 8 carbon atoms with a second, different olefin having from 2 to 8 carbon atoms, a mixture of said olefin with at least one other unsaturated aliphatic hydrocarbon, a mixture of said olefin having from 2 to 8 carbon atoms with a second, different olefin having from 2 to 8 carbon atoms and at least one other unsaturated aliphatic hydrocarbon, a mixture of said olefin with at least one ethylenically unsaturated ester or acid, and mixtures thereof;

b. mixing the polymerization product following polymerization without first pelletizing with shear mixing with at least one graft polymer or copolymer in a heated mixing device at a temperature above the melting point of the components; and

c. recovering the resulting polyolefin-based adhesive resin.

15. The method of claim 14, further comprising the step of adding an adhesion promoting resin to the heated mixing device.

16. The method of claim 15, wherein the adhesion promoting resin comprises a thermoplastic elastomer.

17. The method of claim 15, wherein the adhesion promoting resin comprises a metallocene catalyzed ethylene copolymer.

18. The method of claim 14, wherein the monomer composition is an olefin having from 2 to 8 carbon atoms.

19. The method of claim 18, wherein the monomer composition comprises a mixture of more than 50% by weight ethylene and less than 50% by weight of at least one additional monomer.
20. The method of claim 18, wherein the monomer composition is a mixture of a first olefin having from 2 to 8 carbon atoms and a second different olefin having from 2 to 8 carbon atoms.
21. The method of claim 19, wherein the monomer composition comprises a mixture of ethylene and at least one other unsaturated aliphatic hydrocarbon.
22. The method of claim 19, wherein the monomer composition comprises a mixture of ethylene and an alkene monomer selected from the group consisting of propylene, butene-1, hexene-1, 4-methyl pentene-1, and octene-1.
23. The method of claim 14, wherein the monomer composition comprises a mixture of ethylene and an ethylenically unsaturated ester or acid.
24. The method of claim 23, wherein the monomer composition comprises a mixture of ethylene and an ethylenically unsaturated ester or acid selected from the group consisting of vinyl acetate, methyl acrylate, ethyl acrylate, methyl methacrylate, ethyl methacrylate, butyl acrylate, acrylic acid, and methacrylic acid.
25. The method of claim 14, wherein the monomer composition comprises a mixture of more than 50% by weight ethylene gas and less than 50% by weight butene gas, the graft polymer is at least one polymerizable ethylenically unsaturated carboxylic acid or acid derivative, and the mixing is performed at a temperature above the melting point of the components.

26. A polyolefin-based adhesive resin produced according to the method of claim 1.
27. A polyolefin-based adhesive resin produced according to the method of claim 14.
28. A polyolefin-based adhesive resin produced according to the method of claim 25.
29. A polyolefin-based adhesive resin produced according to claim 1 for use in bonding to substrates.
30. A polyolefin-based adhesive resin produced according to claim 1 for use in bonding polyolefins, polyamides, polyvinyl alcohol, ethylene vinyl alcohol copolymer, metals, glass, wood, and/or paper.
31. A polyolefin-based adhesive resin produced according to claim 1 for use in a fabrication process.
32. A polyolefin-based adhesive resin produced according to claim 1 for use in a fabrication process selected from the group consisting of powder coating, rotational molding, film-forming process using standard cast film and blown film extrusion and coextrusion processes, application to multiple substrates using thermal lamination, extrusion lamination, and extrusion and coextrusion processes including blow molding, sheet extrusion, and pipe.
33. A polyolefin-based adhesive resin produced according to claim 14 for use in bonding to substrates.

34. A polyolefin-based adhesive resin produced according to claim 14 for use in bonding polyolefins, polyamides, polyvinyl alcohol, ethylene vinyl alcohol copolymer, metals, glass, wood, and/or paper.
35. A polyolefin-based adhesive resin produced according to claim 14 for use in a fabrication process.
36. A polyolefin-based adhesive resin produced according to claim 14 for use in a fabrication process selected from the group consisting of powder coating, rotational molding, film-forming process using standard cast film and blown film extrusion and coextrusion processes, application to multiple substrates using thermal lamination, extrusion lamination, and extrusion and coextrusion processes including blow molding, sheet extrusion, and pipe.
37. A polyolefin-based adhesive resin produced according to claim 25 for use in bonding to substrates.
38. A polyolefin-based adhesive resin produced according to claim 25 for use in bonding polyolefins, polyamides, polyvinyl alcohol, ethylene vinyl alcohol copolymer, metals, glass, wood, and/or paper.
39. A polyolefin-based adhesive resin produced according to claim 25 for use in a fabrication process.
40. A polyolefin-based adhesive resin produced according to claim 25 for use in a fabrication process selected from the group consisting of powder coating, rotational molding, film-forming process using standard cast film and blown film extrusion and coextrusion processes, application to multiple substrates using

thermal lamination, extrusion lamination, and extrusion and coextrusion processes including blow molding, sheet extrusion, and pipe.

41. A method of bonding substrates comprising:
 - a. applying to at least one substrate a polyolefin-based adhesive resin produced according to claim 1; and
 - b. applying a second substrate to the polyolefin-based adhesive resin applied to the at least one substrate.
42. A method of bonding substrates comprising:
 - a. applying to at least one substrate a polyolefin-based adhesive resin produced according to claim 14; and
 - b. applying a second substrate to the polyolefin-based adhesive resin applied to the at least one substrate.
43. A method of bonding substrates comprising:
 - a. applying to at least one substrate a polyolefin-based adhesive resin produced according to claim 25; and
 - b. applying a second substrate to the polyolefin-based adhesive resin applied to the at least one substrate.